

Task Example

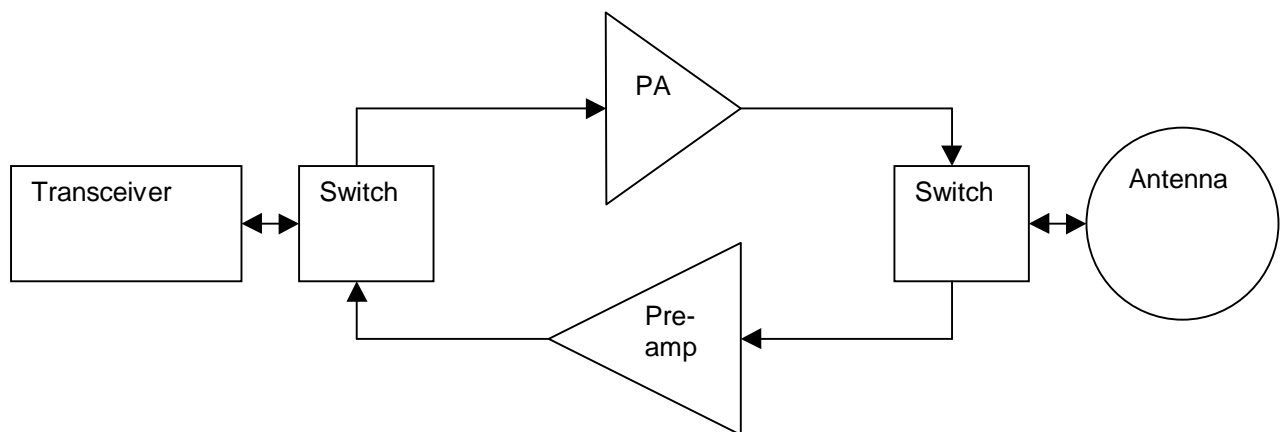
120MHz PA for Navtech Systems

*Phasor
Design*

Task Outline

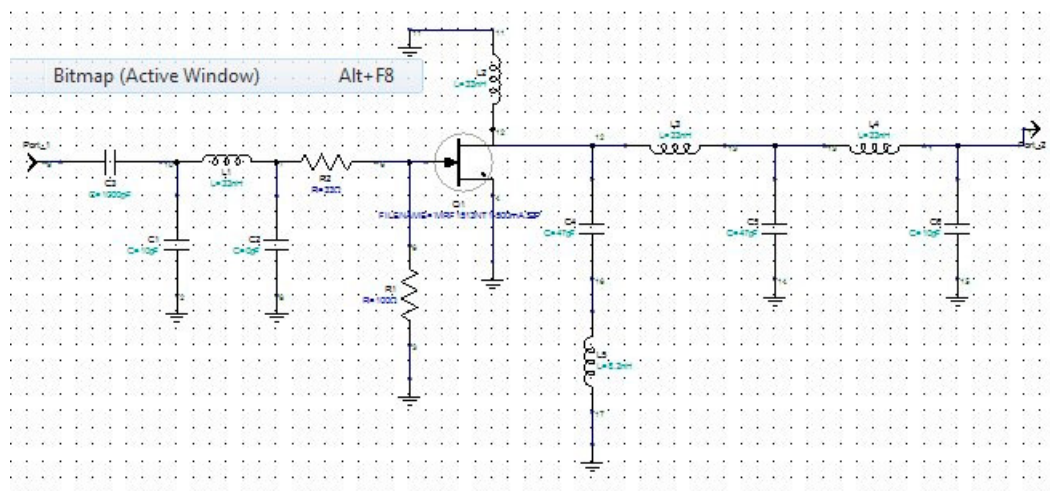
A telemetry system to operate in the 120MHz band was required by Navtech Systems for integration into an aircraft avionics package. Phasor Design proposed a solution based on an existing well-proven telemetry transceiver module and then added a power amplifier, pre-amplifier and appropriate transmit/receive switching.

The solution had to tolerate high levels of vibration and had a very short design cycle.



PA Design

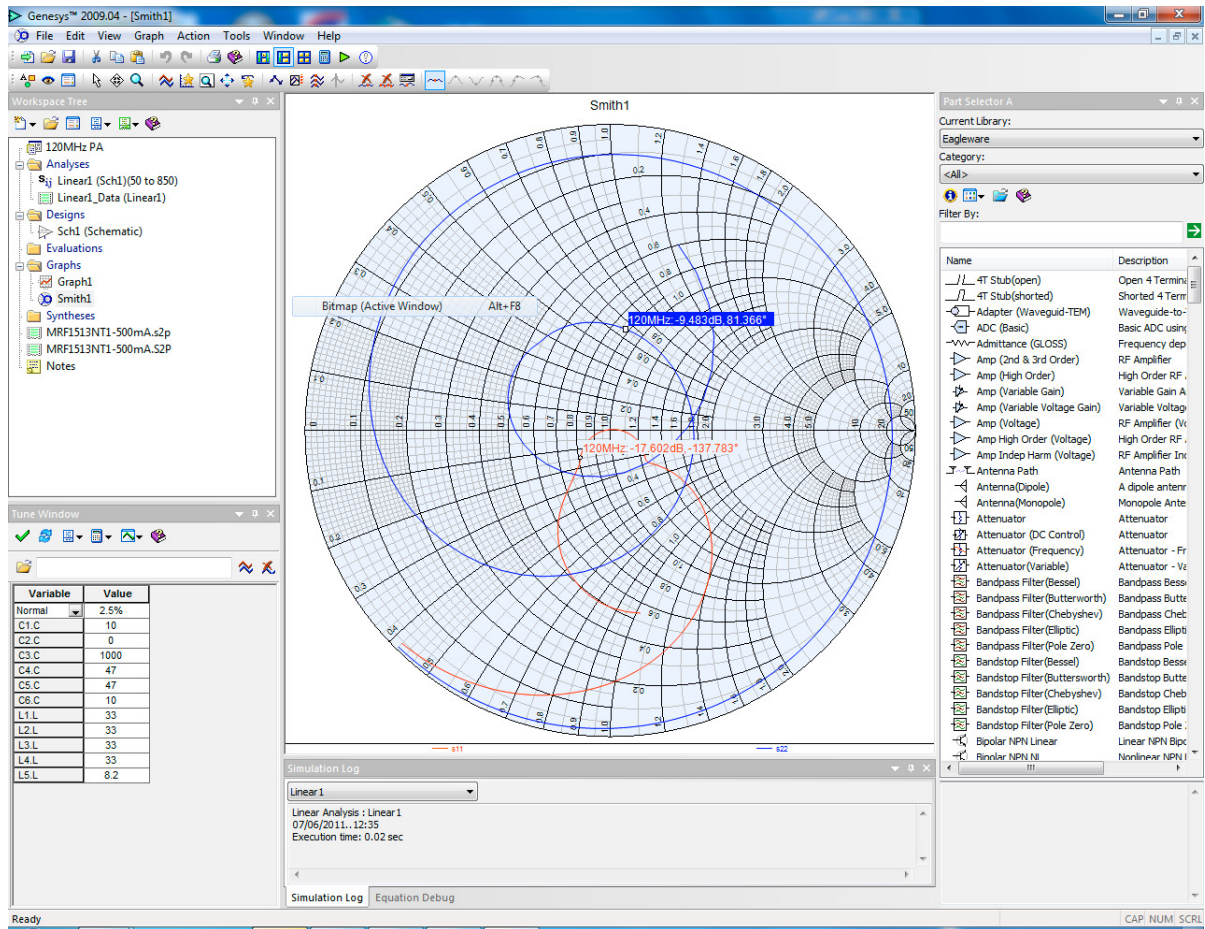
A single device MRF1513N N-Channel Enhancement-Mode Lateral MOSFET was selected to provide about 18dB of gain at 120MHz taking the output power to around 1W. This device is rated at 3W and 11dB of gain with 55% efficiency at 520MHz. The lower operating frequency results in more gain avoiding the need for a driver device. The 3W rating provides a very good margin against failure through stress caused by poor return matches. In addition the device was run at reduced supply of 6V compared to the 12.5V rating. The schematic as draw in Agilent Genesys is shown below.



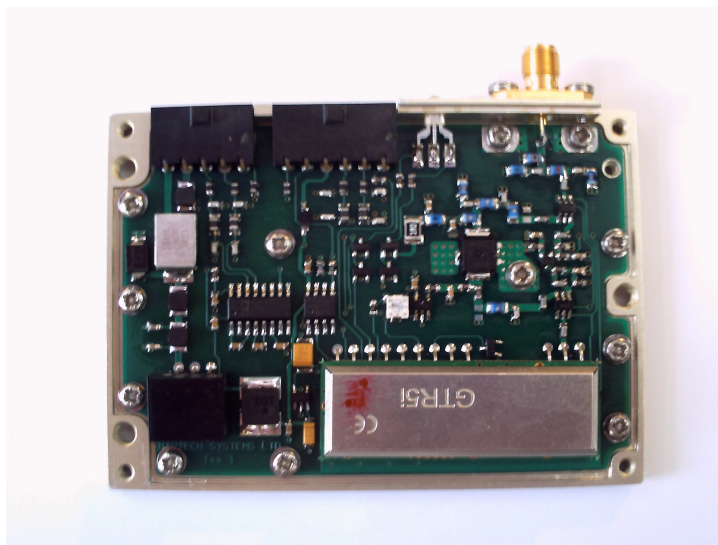
Stability

A major constraint on PA design is stability. The antenna connection can be reflective with any phase and the telemetry module is not likely to have a very good output match. The Agilent Genesys design tool was employed to predict stability factor over a wide range of frequencies and care was taken to ensure the design was stable with a good margin.

The following image shows the process of achieving good input and output match conditions.



Experimental testing with extreme loads confirmed that good stability was achieved. The completed module is shown below.



Conclusions

A small batch of 120MHz telemetry avionics modules were designed and manufactured in a short timescale and are now in service.

Acknowledgements

The work was funded by Navtech Systems Limited.

www.navtechsystems.co.uk

For more details contact Simon W Day at Phasor Design

www.phasor-design.uk.com

14 The Crescent, Market Harborough LE16 7JJ. UK +44 1858 432148 swd@phasor-design.uk.com

www.phasor-design.uk.com

CI registered firm: BS EN ISO 9001:2008: certificate CI/11648

VAT registration 638 2800 35

Page 2 of 2